



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

thv

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/939,457	08/24/2001	Gorou Ikegami	NECN 18.947	3656
26304	7590	10/04/2004	EXAMINER	
KATTEN MUCHIN ZAVIS ROSENMAN			LEWIS, MONICA	
575 MADISON AVENUE			ART UNIT	
NEW YORK, NY 10022-2585			PAPER NUMBER	
			2822	

DATE MAILED: 10/04/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 09/939,457	Applicant(s) IKEGAMI ET AL.	
	Examiner Monica Lewis	Art Unit 2822	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 02 July 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) 6-13 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 8/27/01 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>8/3/04</u> . | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

1. This office action is in response to the request for continued examination filed July 2, 2004.

#### ***Response to Arguments***

2. Applicant's arguments with respect to claims 1-5 have been considered but are moot in view of the new ground(s) of rejection.

#### ***Drawings***

3. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the “plurality of film electrodes” and “plurality of protruding bump electrodes” must be shown or the feature(s) canceled from the claim(s). It appears that only one film and protruding electrode is shown. No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled “Replacement Sheet” in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing

Art Unit: 2822

figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smith (U.S. Patent No. 6,437,240) in view of *Electronic Packaging and Interconnection Handbook* by Charles A. Harper.

In regards to claim 1, Smith discloses the following:

a) a semiconductor chip (1424) having a plurality of film electrodes (1422) on a rear surface of said semiconductor chip and a plurality of protruding bump electrodes (1450) on a front surface of said semiconductor chip (For Example: See Figure 24); and

b) conductive film (1442 and 1444) formed on and contacting said top portion of said protruding bump electrodes and configured as a plurality of interconnect lines (For Example: See Figure 24 and Column 27 Lines 50-56).

In regards to claim 1, Smith fails to disclose the following:

a) an insulator resin film covering said semiconductor chip while exposing said film electrodes and a top portion of each of said protruding bump electrodes, said insulator resin film contacting side portions of each of said protruding bump electrodes.

However, Harper discloses the use of encapsulant (For Example: See Figure 10.37). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Smith to include the

Art Unit: 2822

use of encapsulant as disclosed in Harper because it aids in protection for the device(For Example: See Page 10.21).

Additionally, since Smith and Harper are both from the same field of endeavor, the purpose disclosed by Harper would have been recognized in the pertinent art of Smith.

In regards to claim 3, Smith fails to disclose the following:

a) interconnect lines are connected to respective terminals of the printed circuit board by wire bonding.

However, Harper discloses the use of wire bonding (For Example: See Page 7.80). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Smith to include the use of wire bonding as disclosed in Harper because it aids in interconnection among the components (For Example: See Page 7.80).

Additionally, since Smith and Harper are both from the same field of endeavor, the purpose disclosed by Harper would have been recognized in the pertinent art of Smith.

6. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Smith (U.S. Patent No. 6,437,240) in view of *Electronic Packaging and Interconnection Handbook* by Charles A. Harper and McCormick et al. (U.S. Patent No. 6,369,448).

In regards to claim 2, Smith fails to disclose the following:

a) semiconductor chip is mounted on a printed circuit board, with said rear surface opposing said printed circuit board.

However, McCormick discloses the use of a printed circuit board (For Example: See Column 6 Lines 59-61). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Smith

Art Unit: 2822

to include the use of a printed circuit board as disclosed in McCormick because it aids in a place for mounting the device (For Example: See Figure 4).

Additionally, since Smith and McCormick are both from the same field of endeavor, the purpose disclosed by McCormick would have been recognized in the pertinent art of Smith.

7. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Smith (U.S. Patent No. 6,437,240) in view of *Electronic Packaging and Interconnection Handbook* by Charles A. Harper, Hirano et al. (U.S. Publication No. 2002/0153618) and Ball (U.S. Patent No. 5,952,725).

In regards to claim 4, Smith fails to disclose the following:

a) protruding electrodes has a base portion having a diameter larger than other portion thereof.

However, Hirano et al. ("Hirano") discloses electrodes with a base larger than the other portion (For Example: See Figure 3). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Smith to include electrodes with a base larger than the other portion as disclosed in Hirano because it aids in providing electrical communication (For Example: See Abstract).

Additionally, since Smith and Hirano are both from the same field of endeavor, the purpose disclosed by Hirano would have been recognized in the pertinent art of Smith.

b) chip is sandwiched between and contacts a pair of printed circuit boards.

Art Unit: 2822

However, Ball discloses printed circuit boards with a chip mounted between (For Example: See Figure 8). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Smith to include printed circuit boards with a chip mounted between as disclosed in Ball because it aids in providing electrical communication (For Example: See Column 8 Lines 1-4).

Additionally, since Smith and Ball are both from the same field of endeavor, the purpose disclosed by Ball would have been recognized in the pertinent art of Smith.

8. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Smith (U.S. Patent No. 6,437,240) in view of *Electronic Packaging and Interconnection Handbook* by Charles A. Harper and Ohuchi et al. (U.S. Patent No. 5,999,413).

In regards to claim 5, Smith fails to disclose the following:

a) a portion of a side surface of said semiconductor chip is exposed from said insulator resin film.

However, Ohuchi et al. ("Ohuchi") discloses the use of an exposed side of a chip (For Example: See Figure 3b). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Smith to include the use of an exposed side of a chip as disclosed in Ohuchi because it aids in providing a place where signals can be input to external circuits (For Example: See Column 3 Lines 14-67 and Column 4 Lines 1-31).

Additionally, since Smith and Ohuchi are both from the same field of endeavor, the purpose disclosed by Ohuchi would have been recognized in the pertinent art of Smith.

Art Unit: 2822

***Conclusion***

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Monica Lewis whose telephone number is 571-272-1838. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on 571-272-1852. The fax phone number for the organization where this application or proceeding is assigned is 703-308-7722 for regular and after final communications. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

ML

September 27, 2004

  
AMIR ZARABIAN  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2000